

Appendix C

Field Compaction Control Forms and Supplemental Instructions

C-1. General

ENG Form 4080 (Figure C-1) is for use where water content control is required to obtain adequate compaction; the title of this form is "Summary of Field Compaction Control of Impervious or Semipervious Soils for Civil Works Projects." ENG Form 4081 (Figure C-2) is for use when water content control (other than complete saturation) is not required; the title of this form is "Summary of Field Compaction Control of Pervious Soils and Rockfill for Civil Works Projects." Use of these forms is described in ER 1110-2-1925.

a. A database package utilizing the commercially available software routine dBase III Plus (Trademark of Ashton-Tate) was developed around the information required for ENG Forms 4080 and 4081; the system uses the microcomputer to analyze data for use in the quality assurance (QA) program. Specially prepared Computer Applications in Geotechnical Engineering (CAGE) software interacts with the database to reduce data, perform statistical analysis, and generate ENG Forms 4080 and 4081 with the information required for reporting. Data from field notes is entered into a microcomputer in a dBase III-driven format; for data manipulation, the system is menu driven and user interactive. CAGE is designed to store, retrieve, and display earthwork construction control data as well as provide summaries of required construction parameters. Hard copies of any of the summaries, reports, and graphs generated may be printed by the system along with computer-generated copies of ENG Forms 4080 and 4081 if they are required in hard copy form. The use and operation of the CAGE system is described by Edris, Strohm, and Woo (1991).

b. If construction control data are recorded manually on ENG Forms 4080 and 4081, information at the top of each form could be placed on a master sheet from which reproducible copies could be made for recording data and for making subsequent copies for submission.

c. Explanation of any abbreviations used which are not explained in the forms, should be furnished with the first report submitted on a project.

d. Lower lines of the forms may be used for necessary remarks.

C-2. Additional Information

Information on items below, as appropriate, should be submitted with the initial reports and also whenever changes are made.

a. Borrow sources and operations.

(1) Description of borrow materials (each borrow or excavation area).

(2) Natural water content.

(3) Method of adding water in pit.

(4) Method of reducing water content in pit.

(5) Method of excavating and mixing (describe equipment used).

(6) Equipment used for loading and transporting material.

b. Compaction equipment. Describe in detail.

(1) Sheepsfoot roller.

(a) Make, model, and whether self-propelled or towed.

(b) State size (diameter and length) and number of drums.

(c) Describe tamping feet: number of rows, feet per row, and total number of feet per drum; length, shape and base area of foot.

(d) Give weight of roller empty, weight as used, type of ballast, and unit pressure (weight of roller divided by total contact areas of tamping feet).

(e) Specify type of frame (rigid or oscillating), speed of travel during compaction, and if cleaners are used.

(2) Rubber-tired roller.

(a) Make and model.

(b) Number of boxes or sections, rolling width, overall width and length.

(c) Number of tires, tire size, ply rating and spacing.

SUMMARY OF FIELD COMPACTION CONTROL OF IMPERVIOUS OR SEMIPERVIOUS SOILS FOR CIVIL WORKS PROJECTS														
PROJECT										CONTRACT NO.				
Main Embankment Closure Section										CONTRACTOR				
RIVER STATE TOWN										DATE OF REPORT				
Dam										REPORT NO. 73				
Main Embankment Closure Section										SHEET 1 of 1				
(S) SPECIFIED OR (D) DESIRED 95 D +2 to -3 S SFR 95 D +2 to -2 S SFR 95 D +2 to -3 S SFR										LOOSE LIFT THICKNESS (IN.) 8 8 8				
UPSTREAM CENTRAL DOWNSTREAM										NUMBER OF PAGES 8 8 8				
SPACE RESERVED FOR PUNCH CARD OPERATOR 1-2 3-4 5-										CONTACT PRESSURE (PSI) 517 517 517				
TEST NO.	DATE MADE	TYPE TEST	STATION	OFFSET (IN.)	ELEVATION (IN.)	CLASS	WORD OR LETTER SYMBOL	CLASSIFICATION	TEST IDENTIFICATION	TEST DATA	STANDARD METHOD	LABORATORY TEST DATA	FIELD AND LABORATORY CORRELATION	COMMENTS
488	4 Mar 1965	SV	147+50	480 DS	93	DS	Central	US	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	112.7 12.9 -3.1 102	
489	4 Mar 1965	CYL	149+30	20 DS	104	DS	Central	US	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	107.2 17.1 -0.6 103	
490	4 Mar 1965	CYL	149+00	175 US	105	US	US	US	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	116.0 12.9 +1.2 96.5	
545	9 Jul 1963	NM	10+05	110 US	1375	A	A	A	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	113.5 0 98.8	Check test on NM
3	9 Jul 1963	WV	10+05	110 US	1375	A	A	A	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	113.5 0 97.7	
CRF-7	1963	SV	7+25	85 DS	797	Random	Random	Random	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	124.8 10.2 -3.0 97.3B	
CRF-8	6 Sep 1963	SV	8+00	90 US	826	Impervious	Impervious	Impervious	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	126.3 10.2 -0.6 94.1B	
404	19 Aug 1964	CYL	30+00	8 DS	705	Impervious Core	Impervious Core	Impervious Core	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	84.0 37.0	
707	21 Sep 1964	CYL	20+00	C	801	Impervious Core	Impervious Core	Impervious Core	Following data from Spillway Excav	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	WATER COM. DRY DENSITY (PCF)	81.0 81.0	
Information not given in field report but should have been. ATTN: Compaction procedure using 12-in. mold was added to EM 1110-2-1906 after note on COL 20 (see below) was prepared.														

Figure C-1. Specimen sheet showing data actually reported from several projects

[illegible]

(d) Weight empty and as used, type of ballast, tire pressure, and load per tire as used.

(e) Speed of travel during compaction.

(3) Vibratory roller.

(a) Make and model.

(b) State size (diameter and length) and number of drums.

(c) Give weight of roller empty, static weight per roller used, dynamic ground pressure exerted, type of ballast, and vibrating frequency.

(d) Speed of travel during compaction.

c. Embankment operations.

(1) Type of equipment used in spreading and mixing the material.

(2) Method of removing oversize rock fragments.

(3) Method of adding water on the fill.

(4) Method of reducing water content of the fill.

d. Compaction control methods.

(1) For impervious or semipervious fill: Describe the methods used to determine in-place density and water content. Also report method of correcting for oversize particles and for correlating field density and water content for material with oversize particles with laboratory density and water content. Submit a copy of any reference curves used for correlating the field data with the laboratory data.

(2) For pervious fill or rock fill: Describe in detail methods used in determining laboratory maximum and minimum densities (if different from those specified in EM 1110-2-1906) and in determining field densities of pervious soils and rock fill. Also include details of methods used for correlating field and laboratory densities in determining percent compaction or relative density and details of methods used in correcting for oversize particles.